Health Behavior and Status Related to Mother's Death in Timor-Leste

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Article history:	**Abstract**
	Maternal mortality (MMR) in República Democrática de Timor-Leste (RDTL) is still high among developing countries. Meanwhile, the study on the model of the relationship between medical factors, non-medical factors and factors of health care system to reduce these figures has not been done in-depth study and independent. Objective: This study aims to demonstrate health behavior and health status as a contributing factor to maternal deaths throughout Timor-Leste. Methods: The study used a case-control study design study with a retrospective approach to study the correlation dynamics between cause and effect factors. The variables collected include the characteristics, behavior and health status of the mother. Then the odds ratio is calculated to explain the strength of the causal factor influencing the effect. In this study involving 298 pregnant women living as well as the mother's family gave birth to die at 13 Municipios throughout Timor-Leste. Results and Discussion: The characteristics of the family consist of mother's age, mother's education, mother's job, husband's education, husband's job, family income and number of family members, and then seen their distribution according to the status of life and death. Mothers aged under 15 years and over 45 years have a 2.11 times higher risk of death than mothers aged 16 to 44 years. Maternal health behavior is based on work status during pregnancy, frequency of pregnancy check, place of pregnancy checkup, pregnancy examiner, K1 examination, 2nd trimester pregnancy examination, K4 examination and utilization of health facility type during pregnancy complication. Women with anemia status had 3.98 times higher risk of death compared with non-anemic mothers. Mothers with a history of the disease had 2.61 times higher risk of death compared to women without a history of the disease.

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1. Introduction

Maternal death is the death of a woman during pregnancy or within 42 days of termination of pregnancy, regardless of duration and place of pregnancy, of any cause associated with or aggravated by pregnancy or treatment but not from accidental or incidental causes.1 This 42-day limit may change as It has been recognized that in the presence of new procedures and technologies the occurrence of death can be prolonged and delayed so that the ICD-10 also incorporate es a new category called late maternal death, ie, the death of women due to a more direct or indirect obstetric cause that occurs of 42 days but less than one year after the end of pregnancy.1 Maternal death is a function of many things, not just from health-care factors alone. Pregnancy and too early childbirth, poverty, ignorance, women's silent culture, and low status of women on certain matters. Difficult transportation, inability to pay for good services and certain restrictions on pregnant women also play a role.2 According to Skinner (1938), health behavior is a person's response to stimuli or health-related objects-pain, illness, and Factors that influence health-illness (health) such as environment, food, and health services.3 According to Saifudin (2003), the number of pregnancies 2 to 3 is the safest number seen from the point of maternal mortality. Parity is less than one and the age of the mother is too young in categorizing high risk because the mother is not ready mentally or medically while the party is above four and the mother's age is too old physically mother to decline to undergo pregnancy.4 The cause of maternal mortality or AKI in Timor- Leste respectively are as follows: 24% bleeding 20% indirect causes such as infection, malaria, hepatitis, human immune deficiency virus / acquired immunodeficiency, 15% puerperal sepsis, 13% unsafe abortion, 12% eclampsia, 8 % Partus jam and 8% other unknown cause (Suzanne, 2009).

2. Materials and Methods

The study used a case-control study design with a retrospective approach to study the correlation dynamics between cause and effect factors. The variables collected include the characteristics, behavior and health status of the mother. The method of collecting data by observation or data collection approach at once or point time approach.6 Then calculate the value of odds ratio to explain the strength of causal factors affects the effect. In this study involving 298 pregnant women living as well as families giving birth to mothers in 13 Municipios / District throughout Timor-Leste.

3. Results and Discussions

3.1 Research Results

a) Family characteristics consisted of mother's age, mother's education, mother's job, husband's education, husband's job, family income and a number of family members, who then viewed their distribution according to the living dead status. In detail, the distribution of data can be seen in table 1. Mothers aged under 15 years and over 45 years have a risk of death 2.11 times higher than mothers aged from 16 years to 44 years. The low education level of mothers (elementary and junior high) has a death risk of 2.79 times higher compared with mothers with higher education (senior high school and university level). Mothers with temporary jobs have a 6.97 times higher risk of death compared to mothers with regular jobs. The low education level of a husband (elementary and junior high) has a risk of death 3.32 times higher compared with husbands with higher education (senior high school and university level). Husbands who have temporary jobs have a risk of death 1.26 times higher than the husband who has a permanent job. Families with revenues of < $ 115 per month had an increased risk of death 2.61 times higher than families with an income of ≥ $ 115 per month. Mothers with > 2 children have an increased risk of death 1.44 times higher than those with ≤ 2 person children.

Table 1
Sample distribution by family characteristics and death status of life

No	Variable	Dead and Lives Status		Jumlah	Odds Ratio	95% Confidence Interval	
		Dead	Lives			Lower	Upper
1.	Mother's age						
	a. <15 - >45 years	131 (44.0%)	138 (46.3%)	269 (90.3%)	2.110	.927	4.800
	b. 16 -. 44 years	9 (3.0%)	20 (6.7%)	29 (9.7%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
2.	Mother education						
	a. Low	80 (26.9%)	51 (17.1%)	131 (44.0%)	2.797	1.744	4.487
	b. High	60 (20.1%)	107 (35.9%)	167 (56.0%)			
	Total	40(47.0%)	158 (53.0%)	298 (100.0%)			
3.	Mothers job						
	a. Not Fixed	125 (41.9%)	86 (28.9%)	211 (70.8%)	6.977	3.752	12.974
	b. Fixed	15 (5.1%)	72 (24.1%)	87 (29.2%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
4.	Husbands education						
	a. Low	73 (24.5%)	39 (13.1%)	112 (37.6%)	3.325	2.035	5.430
	b. High	67 (22.5%)	119 (39.9%)	186 (62.4%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
5.	Husband's Job						
	a. Temporary	86 (28.9%)	88 (29.5%)	174 (58.4%)	1.267	.797	2.013
	b. Permanent	54 (18.1%)	70 (23.5%)	124 (41.6%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
6.	Family income						
	a. < $ 115	93 (31.2%)	68 (22.8%)	161 (54.0%)	2.619	1.635	4.196
	b. ≥ $ 115	47 (15.8%)	90 (30.2%)	137 (46.0%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
7.	Number of Children						
	a. > 2 person	83 (27.9%)	107 (35.9%)	190 (63.8%)	.694	.432	1.115
	b. ≤ 2 person	57 (19.1%)	51 (17.1%)	108 (36.2%)			
	Total	140 (47.0%)	158 (53.0%)	298 (00.0%)			

b) Health Behavior

Maternal health behavior is based on work status during pregnancy, the frequency of pregnancy check, pregnancy check up the place, pregnancy examiner, K1 examination, 2nd-trimester pregnancy examination, K4 examination and utilization of health facility type during pregnancy complication. In detail, the distribution of data can be seen in table 2. Mothers who do not work during pregnancy have a risk of death 1.54 times higher than working mothers. Mothers who had pregnancies less than standard frequency 4 times had a risk of death 18.86 times higher than mothers who checked according to the standard. Mothers who had pregnancies to a non-health facility had a 2.89-times higher risk of death compared to mothers who went to health facilities (hospital, center *saude* / Puskesmas, *postu saude* / sub health center). Mothers examined by non-health workers have a 2.14 times higher risk of death compared to those examined by health personnel. Mothers who did not have a K1 pregnancy had a 3.12 times higher risk of death than women who had a pregnancy test. Mothers who did not have a pregnancy checkup in the 2nd trimester had 27.78 times higher risk of death than mothers who had to check up the pregnancy. Mothers who did not have a K4 during pregnancy had 22.73 times higher risk of death compared with mothers examining the pregnancy. Mothers who did not use health facilities during pregnancy complications had 4.25 times higher risk of death compared to women using health facilities.

Table 2
Sample distribution by health behavior death and life status

No	Variable	Dead and Lives Status		Total	Odds Ratio	95% Confidence Interval	
		Dead	Lives			Lower	Upper
1.	Working status during pregnancy						
	a. Work	94 (31.5%)	90 (30.2%)	184 (61.7%)	1.544	.962	2.477
	b. No job	46 (15.5%)	68 (22.8%)	114 (38.3%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
2.	Frequency of pregnancy check						
	a. Less	70 (23.5%)	150 (50.3%)	220 (73.8%)	.053	.024	.117
	b. Enough	70 (23.5%)	8 (2.7%)	78 (26.2%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
3.	Place of pregnancy check						
	a. Non health fasilities	102 (34.2%)	140 (47.0%)	242 (81.2%)	.345	.186	.639
	b. Health facilities	38 (12.8%)	18 (6.0%)	56 (18.8%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
4.	Pregnancy Examiner						
	a. Non health professional	7 (2.3%)	16 (5.4%)	23 (7.7%)	.467	.186	1.171
	b. Health professional	133 (44.7%)	142 (47.6%)	275 (92.3%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
5.	Pregnancy Examiner K1						
	a. Never	120 (40.3%)	150 (50.3%)	270 (90.6%)	.320	.136	.752
	b. Ever	20 (6.7%)	8 (2.7%)	28 (9.4%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
6.	Second Trimester Pregnancy examiner						
	a. Never	73 (24.5%)	153 (51.3%)	226 (75.8%)	.036	.014	.092
	b. Ever	67 (22.5%)	5 (1.7%)	72 (24.2%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
7.	Pregnancy Examiner K4						
	a. Never	63 (21.1%)	150 (50.3%)	213 (71.5%)	.044	.020	.096
	b. Ever	77 (25.8%)	8 (2.7%)	85 (28.5%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
8.	Utilization of Health Facilities when complications occur						
	a. Non health facilities	73 (24.5%)	130 (43.6%)	203 (68.1%)	.235	.139	.397
	b. Health facilities	67 (22.5%)	28 (9.4%)	95 (31.9%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			

c) Health Status

Maternal health status is based Chronic energy deficiency status, anemia status, history of illness (eg heart disease, diabetes mellitus, asthma, tuberculosis, hepatitis, malaria), history of miscarriage, pregnancy complication, previous delivery status, Complications after 42 days of childbirth (eg haemorrhage, high blood pressure (preeclampsia / eclampsia), infection (fever + fluid outflow from the birth canal / pain during urination /

hip pain / swollen breasts and pain (mastitis). Mothers with Chronic energy deficiency status had 2.14 times higher compared with non-Chronic energy deficiency mothers. Mothers with anemia status had an increased risk of death 3.98 times higher than non-anemic mothers. Mothers with a history of the disease had a 2.61-fold higher risk of death compared with mothers with no history of the disease. Mothers with a miscarriage before the last pregnancy had a risk of death 1.15 times higher than that of a mother who did not a miscarriage. Women who had complications before the last pregnancy had a 5.81-fold higher risk of death compared to women without complications. Mothers who gave birth to an action have a risk of death 1.26 times higher than the mother who gave birth to normal. Women who developed complications after 42 days gave birth 2.76 times higher risk of death compared to women without complications.

Table 3
Sampling distribution by health status and death status of life

No	Variable	Dead and Life Status		Total	Odds Ratio	95% Confidence Interval	
		Dead	Life			Lower	Upper
1.	Mothers Chronic energy deficiency						
	a. Ever	7 (2.3%)	16 (5.4%)	23 (7.7%)	.467	.186	1.171
	b. Never	133 (44.6%)	142 (47.7%)	275 (92.3%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
2.	Anemia status of pregnant women						
	a. Anemia	16 (5.4%)	5 (1.7%)	21 (7.1%)	3.980	1.418	11.170
	b. Never	123 (41.4%)	153 (51.5%)	276 (92.9%)			
	Total	139 (46.8%)	158 (53.2%)	297 (100.0%)			
3.	History of illnesses suffered by pregnant women						
	a. Yes	119 (39.9%)	148 (49.7%)	267 (89.6%)	.383	.174	.844
	b. No	21 (7.0%)	10 (3.4%)	31 (10.4%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
4.	History of miscarriage						
	a. Ever	125 (42.2%)	141 (47.6%)	266 (89.9%)	1.159	.542	2.482
	b. Never	13 (4.4%)	17 (5.7%)	30 (10.1%)			
	Total	138 (46.6%)	158 (53.4%)	296 (100.0%)			
5.	Complications of the last pregnancy						
	a. Ever	78 (26.2%)	139 (46.6%)	217 (72.8%)	.172	.096	.308
	b. Never	62 (20.8%)	19 (6.4%)	81 (27.2%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
6.	Birth status before last delivery						
	a. Medical intervention	102 (34.2%)	122 (40.9%)	224 (75.2%)	.792	.468	1.341
	b. Normal	38 (12.8%)	36 (12.1%)	74 (24.8%)			

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	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			
7.	Complications after 42 days of delivery						
	a. Yes	70 (23.5%)	116 (38.9%)	186 (62.4%)	.362	.223	.588
	b. No	70 (23.5%)	42 (14.1%)	112 (37.6%)			
	Total	140 (47.0%)	158 (53.0%)	298 (100.0%)			

3.2 Discussion

Characteristics of families who need attention to reduce the occurrence of maternal mortality include mothers with temporary employment with Odds Ratio (OR) = 6.97, low level of husband education (primary and junior high) with OR = 3.32, low level of maternal education (basic and primary) with OR = 2.79, family income is still below $ 115 per month with OR = 2.61. This study is different from previous research by Pratama (2016) in Solo that there is no significant relationship between education and maternal death (P = 0.227). This study also does not match previous research by Nurul Aeni (2011) that education level, employment status, and family income are not related to maternal mortality (Pratama, 2016; Nurul Aeni, 2011).

Health behaviors that need attention to reduce the occurrence of maternal mortality include mothers who did not check for pregnancy in the 2nd trimester period with OR = 27.78, mothers who did not get K4 pregnancy with OR = 22.73, mothers who had less than standard pregnancies with OR = 18.86, And mothers who did not utilize health facilities during pregnancy complications with OR = 4.25. This study is in accordance with previous research by Pratama (2016) that there is a significant relationship between ANC examination with maternal death (p = 0,014). This explains that the frequency of antenatal examination in healthcare workers is less than 4 times the risk of experiencing greater maternal mortality when compared with mothers who pass a good antenatal examination. This study also differs from the results of Pratama studies (2016) that there is no significant relationship between delivery and maternal deaths. However, the ideal place of delivery is in a health facility or in a hospital so that at any time a medical emergency or referral to a complete facility can be done at any time. Health behaviors that need attention to reduce the occurrence of maternal mortality include women who had complications before the last pregnancy with OR = 5.81, mothers with anemia status with OR = 3.98, mothers who had complications after 42 days of birth with OR = 2.76 and mothers who had History of disease with OR = 2.61. This study is in accordance with previous research by Arulita in Cilacap that mothers with pregnancy complications have a risk of experiencing maternal deaths 147.1 times greater when compared with mothers without pregnancy complications. The risk for maternal deaths in mothers with a history of disease was 210.2 times greater than in mothers without a history of illness (Arulita, 2007).

Maternal health status that needs attention to reduce the occurrence of pregnant women's death, among others, the mother with chronic energy status has a risk of death 2.14 times higher than mothers who are not with less chronic energy. Women with anemia status had 3.98 times higher risk of death compared with non-anemic mothers. Mothers with a history of the disease had 2.61 times higher risk of death compared to women without a history of the disease. Mothers who had a miscarriage before the last pregnancy have a risk of death 1.15 times higher than the mother who did not miscarry. Women who had complications before the last pregnancy had a 5.81-fold increased risk of death compared with non-complicated mothers. Mothers who gave birth with a medical intervention have a risk of death 1.26 times higher than the mother who gave normal birth. Women who developed complications after 42 days gave birth 2.76 times higher risk of death compared to women without complications. Research conducted by Arulita (2007) with the results obtained that mothers who suffer from anemia during pregnancy have 4 times greater risk to experience maternal death than women who are not suffering from anemia.

4. Conclusion

Characteristics of families who need attention to reduce the occurrence of maternal mortality include mothers with temporary employment with Odds Ratio (OR) = 6.97, low level of husband education (primary and junior high) with OR = 3.32, low level of maternal education (basic and primary level education) with OR = 2.79, family income is still below $ 115 per month with OR = 2.61. Health behaviors that need attention to reduce the occurrence of maternal mortality include mothers who did not check for pregnancy in the 2nd trimester period with OR = 27.78, mothers who did not get K4 pregnancy with OR = 22.73, mothers who had less than standard pregnancies with OR = 18.86, And mothers who did not utilize health facilities during pregnancy complications with OR = 4.25. Health behaviors that need attention to reduce the occurrence of maternal mortality include women who had complications before the last pregnancy with OR = 5.81, mothers with anemia status with OR = 3.98, mothers with complications after 42 days of birth with OR = 2.76 and mothers who had a history of disease with OR = 2.61. Maternal health status that needs attention to reduce the occurrence of pregnant women's death, among others, the mother with chronic energy status has a risk of death 2.14 times higher than mothers who are not with less chronic energy. Women with anemia status had 3.98 times higher risk of death compared with non-anemic mothers. Mothers with a history of the disease had 2.61 times higher risk of death compared to women without a history of the disease. Mothers who have had a miscarriage before the last pregnancy have a risk of death 1.15 times higher than the mother who did not miscarry. Women who had complications before the last pregnancy had a 5.81-fold increased risk of death compared to women without complications. Mothers who gave birth with a medical intervention have a risk of death 1.26 times higher than the mother who gave normal birth. Women who developed complications after 42 days gave birth 2.76 times higher risk of death compared to women without complications.

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